# LG Motor Control Center

- Standard Rating
- GCC-H type
- GCC-V type
- GCC-N type
- External connection method based on JEM Standards
- CERIFICATE

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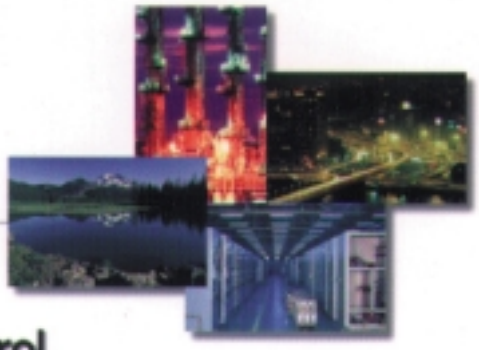
LG Industrial Systems



# LG Motor Control Center

Type : GCC-H, GCC-V, GCC-N

# Quite Suitable for a Wide Range of Industrial Facilities From Plants To General Factories.

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LG GCC-H, GCC-V and GCC-N Type Control Centers are systems of high performance, high reliability, safe operation and versatility, best suited in protecting and controlling low-voltage motors used in industrial facilities.

*Power Plants & Steel Mills*
*Petrochemical Plants*
*Cement Plants & Paper Mills*
***Gas, Water and Sewage Facilities***
**Buildings**
**Subways**
***General Factory Facilities***

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### Adoption of expansive C-wiring duct compartment

Workability and safety in the power distribution area have been greatly improved, allowing ever more efficient and safe wiring and checking activities.

### Easiness in additional unit installation

After completion of installation and during operation of the equipment, additional units can be installed by using the consolidated terminal compartment of the body or other space.

### Structure that provides flexibility to MCC plan

The height of the control center body is varied in increment of 100 mm for convenient planning of heights of the horizontal busbar compartment, unit compartment and consolidated terminal compartment.

### Installation with minimum space

The depth of the body is maintained at 550 mm for both single and dual plane H- and V-types for convenience of installation in limited space.

### High performance and reliability

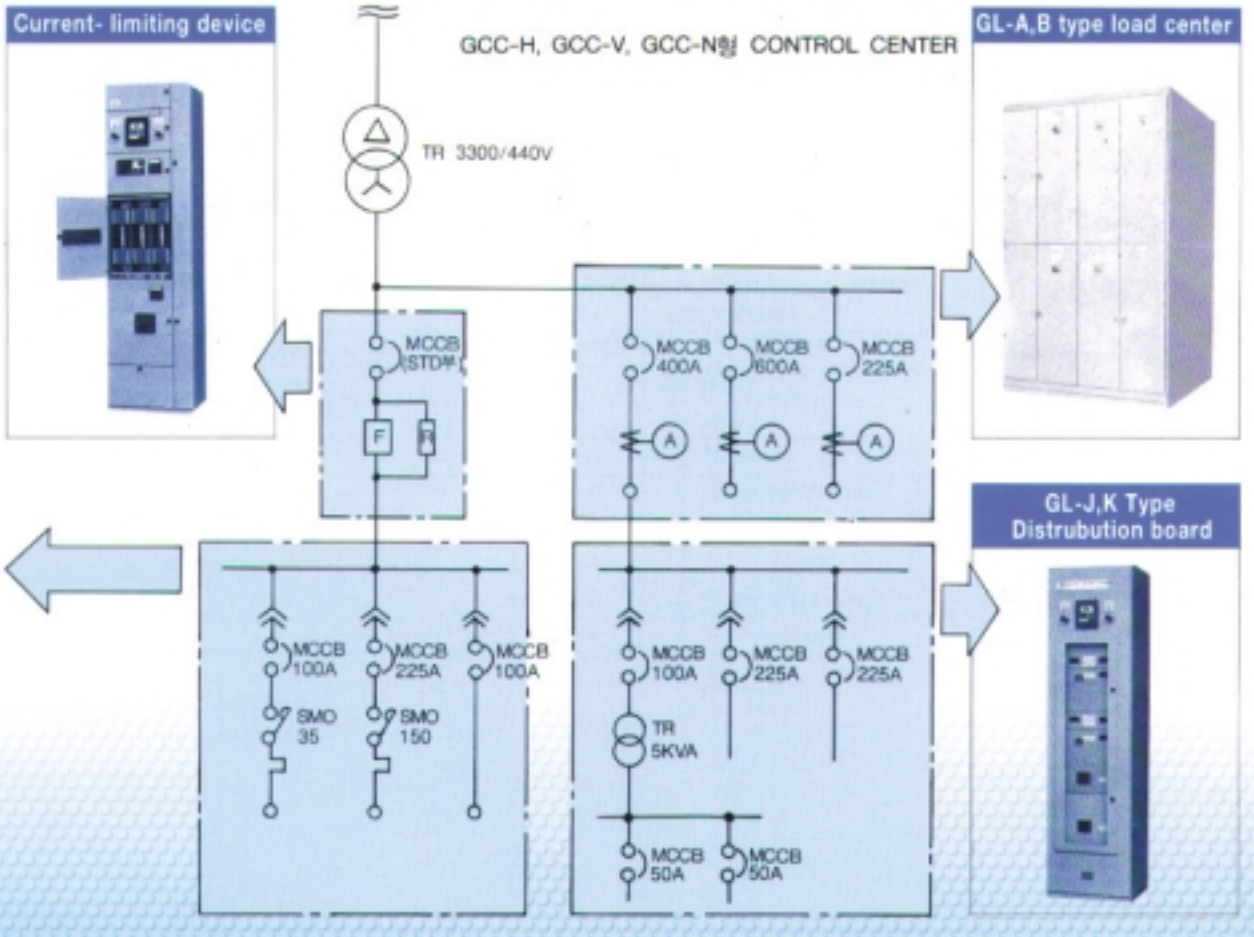
N-type control centers, whose main power source, load side and control circuits are automatically connected or detached collectively at draw-out, are highly efficient and reliable products suitable for application to power plants, steel mills and chemical plants.

### Easy maintenance and safety

Sufficient space is provided for external wiring and service.
Safety shutter will also be available upon request for enhanced safety.

### Related products are also reliable.

Current-limiting device | GL type load center | GL-J, K type Distrubution board

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# Standard Rating

| Item | Description | | Standard spec. | | | Special spec. |
|---|---|---|---|---|---|---|
| | | | GCC-H type | GCC-V type | GCC-N type | |
| General spec. | Applicable standards | | JEM1195, IEC439, NEMA, ICS2'232 | | | ANSI C19.7 BS 5486 |
| | Structure of casing | | IEC IP20 NEMA TYPE1 | | | IEC IP42 |
| | Environment | Place of installation | Indoor | | | |
| | | Elevation | 2000m Max | | | |
| | | Ambience temp | -5°C~40°C | | | |
| Ratings | Rated voltage | | Max. AC 480V | | | |
| | Rated insulation voltage | | AC 600 V | | | |
| | Operation & control voltage | | 110, 220 V | | | 100,120, 200V |
| | Rated frequency | | 60Hz | | | 50Hz |
| | | | 600~2000 A | 600~3500A | 600~4000A | |
| | | | 400, 600, 800 1000A | 400,600,800 1000A | 600,800 1000A | |
| | Rated short-time current | | 42KA/0.5sec | | | 65KA/1sec |
| Casing | Size (mm) | Single plane type | 600"×550" ×2350" | 600"×500" ×2350" | 800"×500" ×2350" | *For standard size, see PLAN. |
| | | Dual plane type | 600"(630)×550" ×2350" | 630"×550" ×2350" *2 | 800"×800" ×2350" *1 | |
| | Thickness | Frame | 2.3mm | | | |
| | | Door | 1.6mm | | | 2.3mm |
| | | Top & Side plate | 1.6mm | | | |
| Unit | Basic unit | | 100mm | 100mm | 100mm | |
| | | Main Power side | Automatic draw-out | | Draw-out | |
| | | Main Load side | Terminal connection | | Draw-out | Automatic Draw-out |
| | | Control | Terminal connection | | Draw-out | Manual draw-out |
| Painting | Inside/outside of panel | | MUNSELL 5Y 7/1 | | | Designated by customer |
| | Instruments | | MUNSELL N1.5 | | | |
| Name plate | Material | | Acrylic | | | |
| | Letter type & color | | Gothic, black | | | |
| | Base color | | White | | | |

| Item | Description | | | Standard spec. | | | Special spec. |
|---|---|---|---|---|---|---|---|
| | | | | GCC-H type | GCC-V type | GCC-N type | |
| Ground | Busbar | | Material | Copper | | | |
| | | | Size | 3' × 25 | | | |
| | Location | | | Bottom | | | |
| Busbar | Material & Shape | | Horizontal busbar | Copper (flat busbar) | | | |
| | | | Vertical busbar | Copper (Z-shape or L-shape) | | | |
| | | | Plating | Ag plating | | | Sn plating |
| | Phase layout | AC | From left | R, S, T, N | | | |
| | | | From up | R, S, T, N | | | |
| | | | Front front | R, S, T, N | | | |
| | | DC | From left | N, P | | | |
| | | | From up | P, N | | | |
| | | | From front | P, N | | | |
| | Phase color | | | Color Sticker | | | |
| | | AC | R | Red | | | Designated by customer |
| | | | S | White | | | Designated by customer |
| | | | T | Blue | | | Designated by customer |
| | | | N | Black | | | Designated by customer |
| | | DC | P | Red | | | |
| | | | N | Blue | | | |
| Wiring | Wire | | Main | KIV 3.5 mm² or thicker(Black) | | | |
| | | | Control | KIV 1.25 mm² (Grey) | | | |
| | Laying method | | Main | B-wiring | | | C-wiring |
| | | | Control | B-wiring | | | C-wiring |
| Others | Door interlock | | | ● Door opening is prevented while MCCB is on. (Lock release device is installed.) | | | |
| | | | | ● Padlocking function when MCCB is on or off. | | | |

# GCC-H type

A low-voltage motor control center of high efficiency, high reliability and versatility that can be applied to a wide range of facilities for buildings and general industries.

## 1. Construction

Unit Door complete with interlock ①

Latch and draw-out structure for easy checking and convenient handling of unit ②

Wide wiring duct for easy wiring work ③

Modular design unit in 100mm step ④

Door lock assembly (Industrial patent pending, 87-3112) ⑤

Safe horizontal busbar compartment ⑥

Steel rolled forming frame ⑦

Enclosure for easy line-up ⑧

MCCB operating handle with safety lock ⑨

Identical depth for single plane or dual plane types ⑩

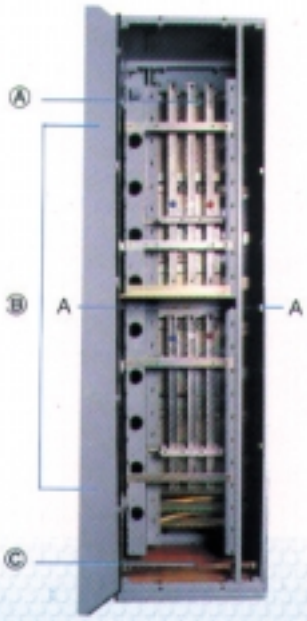
Easily detachable side panel ⑪

Cable compartment usable as additional unit ⑫

Z-type busbar with high short-circuit strength ⑬

## Enclosure

Modification of unit construction is easy and wiring work can be done with ease.




* Same size enclosure can serve both single and dual plane types. (Refer to Fig. 2.)

(A) Vertical bus

(B) For unit compartment
(can be varied in increment of 100 mm.)

(C) Cable compartment

Fig. 2 Horizontal section (section A-A)

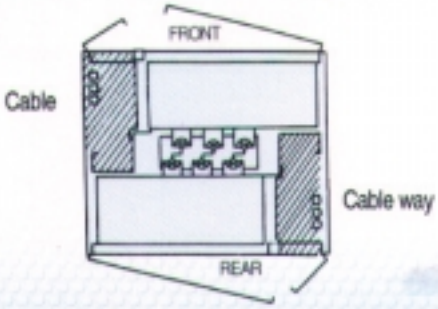



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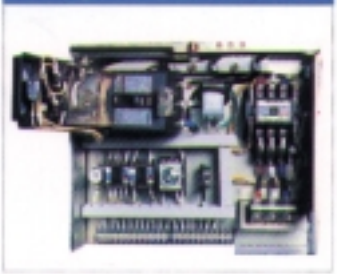
**Fig. 3 Structure of H-type control center**

**Fig. 4 Compact unit**



Compacting of the unit is achieved through ideal lay-out of components.

**Fig. 6 Cable compartment**

Full adoption of B-wiring method will allow use of cable compartment as a unit.

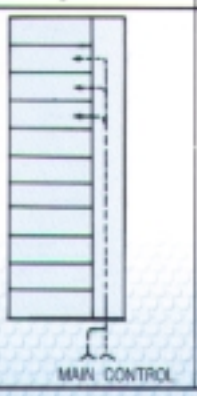
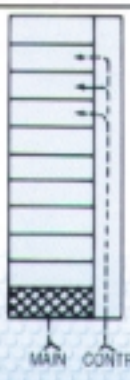
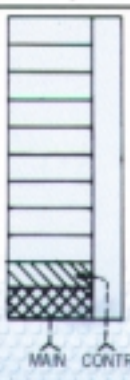
**Fig. 5 Cable support**

Cable supports are provided for easy wiring work in Cable way

**Fig. 7 Vertical wire way**

- Wide cable way improved work efficiency and safety.
- Works inside the cable way can be carried out safely even when the busbar is alive.

## Wiring methods and stacks

| Wiring method (JEM1195) | | B – B | B – C | C – B | C – C |
|---|---|---|---|---|---|
| | | Main B | Main B | Main C | Main C |
| | | Control B | Control C | Control B | Control C |
| Stacks | 200 mm | 9(max 10) | 9 | 9 | 8 |
| | 300 mm | 6 | 6 | 6 | 5 |
| Example | |  | |  |  |



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### Horizontal bus (Fig. 8)

Horizontal bus is normally installed at the upper part; however, it can be installed at the lower part upon request. Horizontal bus is segregated by steel barrier to ensure safety.

### Vertical bus (Fig. 9)

Vertical bus are installed in the middle part of the board as shown in the horizontal section view in Fig. 2, and both front and rear sides can be used in unit compartment. Protective covers of flame-resisting insulation material or steel material are installed to enhance safety.

### Ratings of bus

Refer to Table 1 for busbar ratings.

**Table 1. Bus ratings**

| Item | Ratings |
|---|---|
| Horizontal bus (A) | 600, 800, 1000<br>1200, 1600, 2000, 2200 |
| Vertical bus (A) | 400, 600, 800, 1000 |

### Bus supporter (Fig. 10)

Bus is supported by props of strong fiber-glass polyester that can sufficiently withstand the force of short-circuit current.

### Supporting distance comparison between rectangular busbar and Z-shape bus

The number of strips of 1800 mm long busbar supportable over 30 KA RMS short-circuit is 7 for rectangular busbar and 3 for Z-shape bus

Fig. 8 Horizontal bus

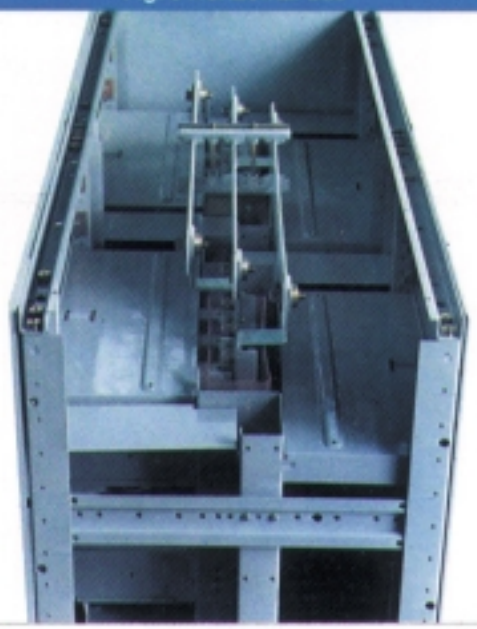
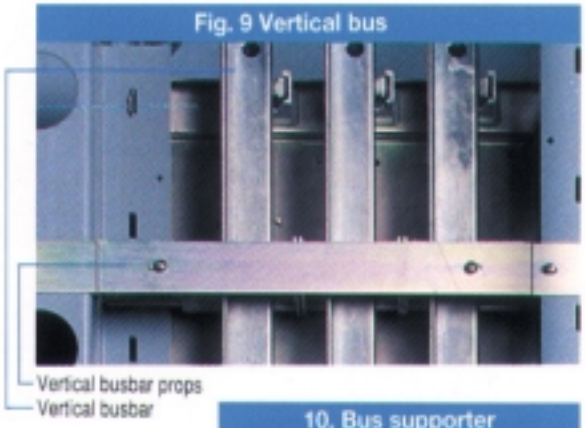
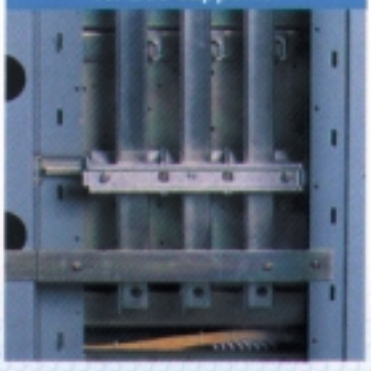
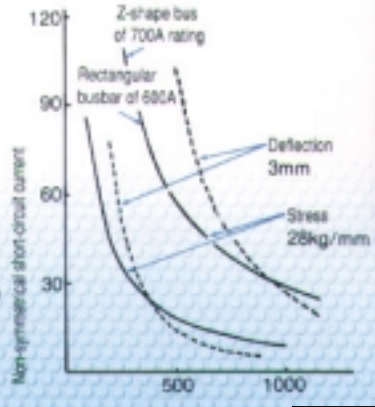


Fig. 9 Vertical bus




10. Bus supporter






**Bussupporting distance (mm)**

Is: Non-symmetrical short-circuit peak value (kA)
D: Busbar spacing (cm)
J: Busbar supporting distance(cm)
M: Attenuation multiplier per current phase
K: Shape coefficient

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Fig.11 Stab connector (floating grip)

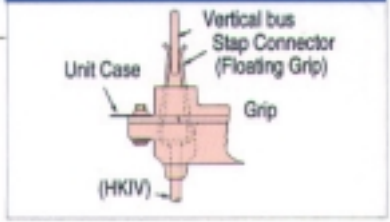



Fig.12 Power cable connector point

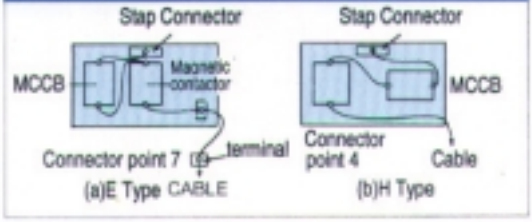
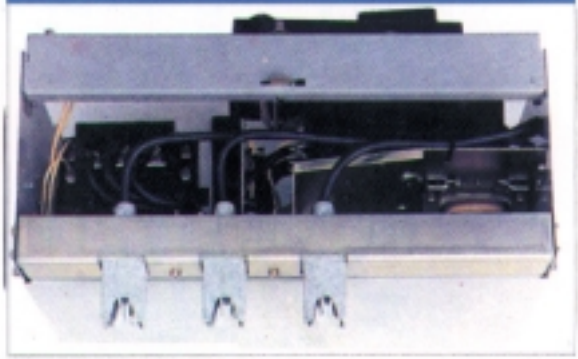



Fig.13 Complete insulation of unit power side



### Stab Connector (Floating Grip) (Fig.11)

The connection mechanism with busbar is secured by stab connector of the operating structure. All components of the connector are mounted inside a fiber-glass polyester case with lines connected, preventing exposure of live parts to ensure safety.

### Best reliability with minimum connection points

One of the features of H-type control center is its small number of connecting points. More faults occur at terminal connection points than any other places. To minimize points of connection is to reduce the ratio of faulty operation, and to reduce time spent for service. Figure 14 shows the difference of required connection points between conventional control center and H-type control center. While the conventional type requires 4 points of connection, H-type requires only 3 points.

### Complete insulation of unit power side

The line between the connector powered by vertical busbar and power source terminal of MCCB is charged even when MCCB is turned off with unit mounted. But it is completely insulated by the insulated connector and the vinyl cap on the power source terminal of MCCB as shown in Figure 15. The insulation, together with the electrical insulation of the busbar, has the following significance:

Fig.14 The padlock device of MCCB

(1) At a fault interruption, there is no spread of power source fault by arc generated at MCCB and the electronic connector.
(2) Safety is greatly ensured during maintenance/check and/or additional installation works.

### MCCB Operation Handle

The padlock device of MCCB operation handle in H-type control center is shown in Figure 16.

- When the door is closed, the padlock works with MCCB either "ON" or "OFF". With MCCB "ON", the door cannot be opened; the door can only be opened by turning the lock release screw.

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Fig.15

Fig 16.

Because of integrated structure, checking has become much easier than conventional unit.

Fig.17 Test of the unit

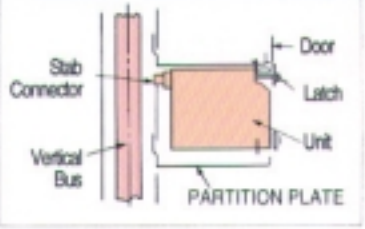
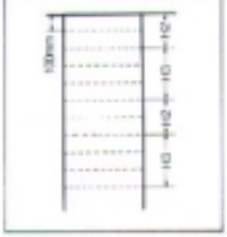



Fig.18 Unit layout



(1) Service : Operating position (connected to busbar)
(2) Test: Testing position (disconnected from busbar)
(3) Draw-out: Drawing-out position (unit can be drawn out)

### Unit draw-out system

The unit can be inserted or drawn out irrespective of other units, and is provided with a lock system to ensure complete engagement in insertion position. Three positions are available, including testing position for complete test (Fig. 17).

### Flexible unit dimensions and alteration of stacks

The basic dimension of the unit is set at 200 mm (H2-type) and an increment by 100 mm pitch is used with an arrangement of holes in 100 mm pitch on the casing for choice of unit position. A simple alteration of stacks is also possible after installation.

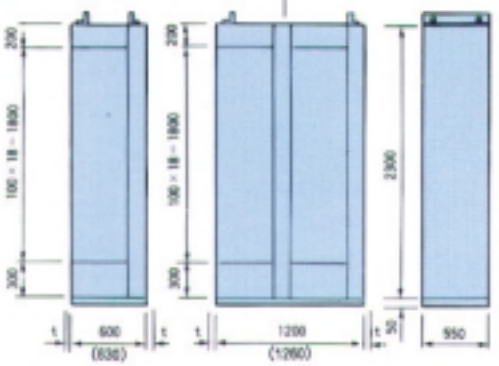
- Additional unit installation
  Additional units can be installed by attaching guide rails, partitions and/or doors to the space available and simply inserting the new units (refer to Fig. 21).

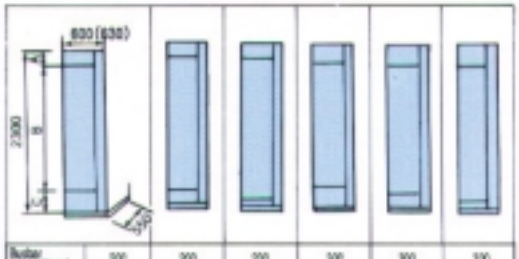
## External dimensions and installation
## Dimensions and installation

H-type control center is available in (one enclosure) of 600 mm (width), allowing convenient installation plan.

## Flexible design planning

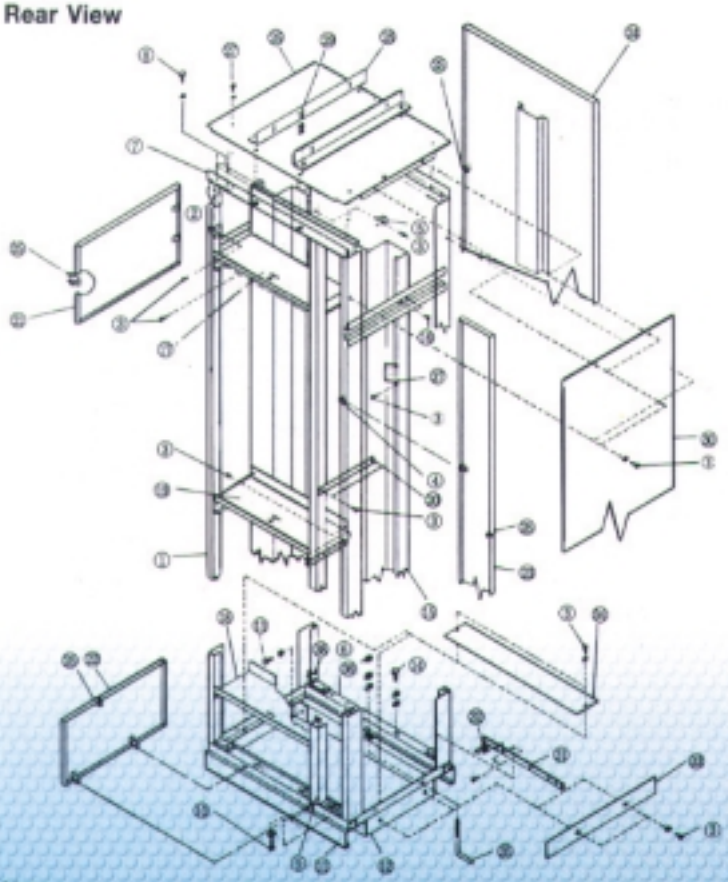
Unit compartment, busbar compartment and terminal compartment can be freely changed according to the capacity of horizontal busbar. A wide version in 700 mm width with expanded cable way compartment is also available for exclusive use with single-plane type.



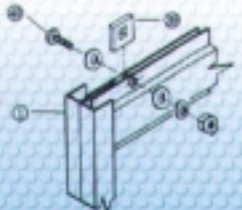




| | | | | | | |
|---|---|---|---|---|---|---|
| Busbar compartment | 200 | 200 | 200 | 300 | 300 | 300 |
| Unit compartment | 1600 | 1900 | 2100 | 1700 | 1800 | 1900 |
| Terminal compartment | 300 | 200 | 100 | 300 | 200 | 100 |
| Horizontal busbar capacity | 1000A | 1000A | 1000A | 1600A | 1600A | 1600A |

### Rear View



| ITEM | DESCRIPTION |
|---|---|
| 1 | V FRAME ASSY |
| 2 | HINGE FOR MAIL |
| 3 | FT SCREW |
| 4 | HINGE FOR MAIL |
| 5 | REAR DOOR LOCK B/K |
| 6 | BOTTOM FRAME |
| 7 | TOP FRAME |
| 8 | BOLT |
| 9 | V FRAME ASSY |
| 10 | BOLT |
| 11 | CHANNEL BASE |
| 12 | CHANNEL BASE SIDE PLATE |
| 13 | BOLT |
| 14 | BOLT |
| 15 | INSTALLATION PLATE |
| 16 | FT SCREW |
| 17 | UNIT TABLE |
| 18 | UNIT TABLE |
| 19 | UNIT TABLE |
| 20 | SUPPORT |
| 21 | UNIT DOOR |
| 22 | FRONT DOOR |
| 23 | DUCT DOOR |
| 24 | REAR DOOR |
| 25 | DOOR LOCK |
| 26 | TOP PLATE |
| 27 | FF SCREW |
| 28 | LIFTING ANGLE |
| 29 | BOLT |
| 30 | SIDE PLATE |
| 31 | EARTH BUS |
| 32 | TERMINAL |
| 33 | PLATE |
| 34 | COVER |
| 35 | FOUNDATION BOLT |
| 36 | NUT |
| 37 | CABLE SUPPORT |
| 38 | EARTH BUS B/K |
| 39 | SPACER |
| 40 | BOLT |



Note : 1. The figures in parenthesis apply to dual panel type where main circuit's secondary side is of automatic draw-out type.

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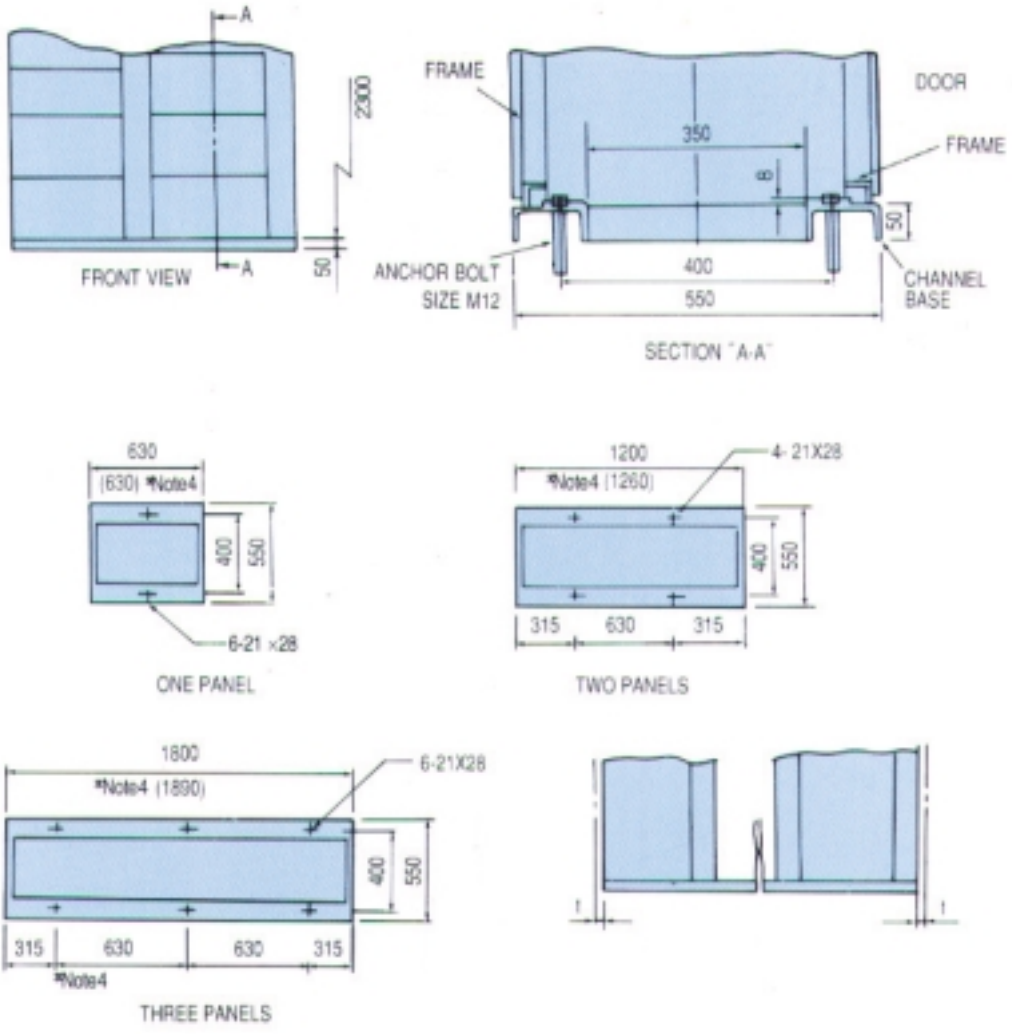
## Installation

Channel base is used in H-type control center to improve safety during installation.
Fig. 23 shows basic installation drawings of this standard.

Fig.19 Basic installation drawings of H-type control center




**Note :** 1. A side plate is installed at the end of the line-up.
2. The maximum number of planes for transportation is 3.
3. "t" denotes dimension of the side plate.
4. The figures in parenthesis apply to dual panel type only where main circuit's secondary side is of automatic draw-out type.

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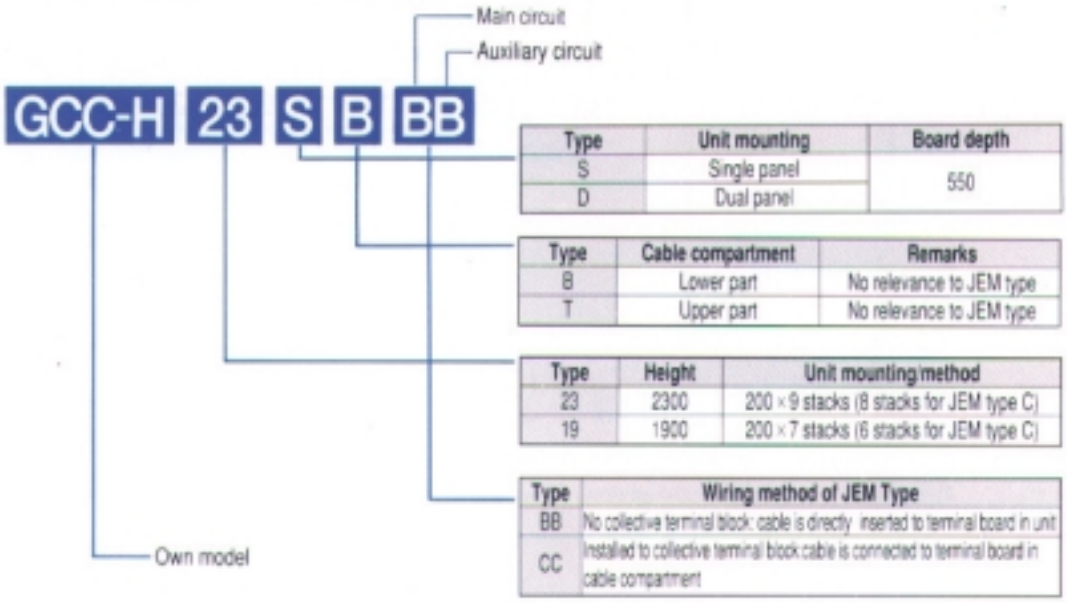
## Control Center Plan

Fig.20 Standard specification code of H-type control center



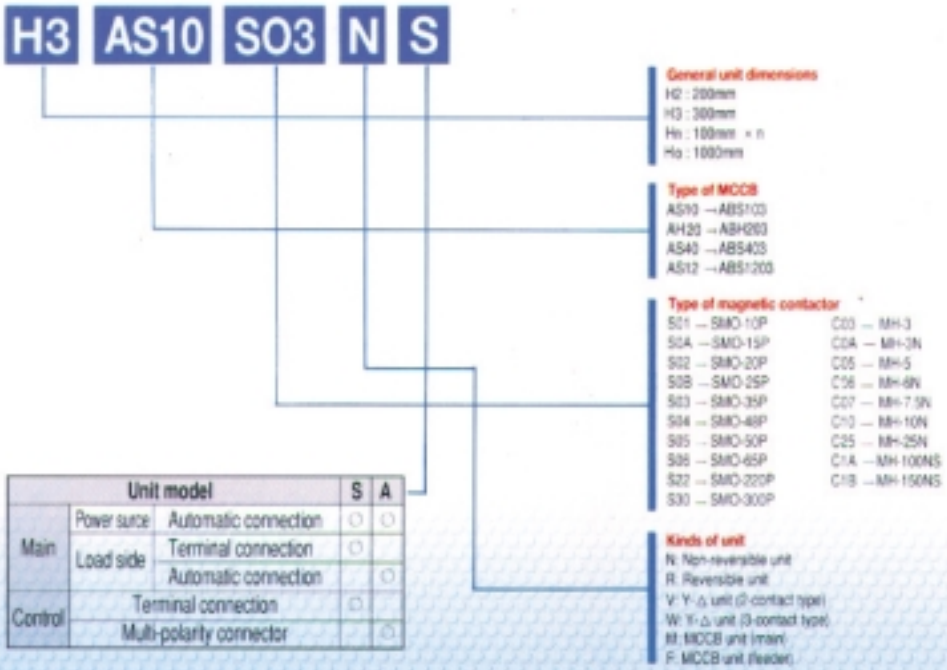

| Type | Unit mounting | Board depth |
|---|---|---|
| S | Single panel | 550 |
| D | Dual panel | |

| Type | Cable compartment | Remarks |
|---|---|---|
| B | Lower part | No relevance to JEM type |
| T | Upper part | No relevance to JEM type |

| Type | Height | Unit mounting method |
|---|---|---|
| 23 | 2300 | 200 × 9 stacks (8 stacks for JEM type C) |
| 19 | 1900 | 200 × 7 stacks (6 stacks for JEM type C) |

| Type | Wiring method of JEM Type |
|---|---|
| BB | No collective terminal block: cable is directly inserted to terminal board in unit |
| CC | Installed to collective terminal block cable is connected to terminal board in cable compartment |

Fig.21 Unit' s standard specification code




| Unit model | | | S | A |
|---|---|---|---|---|
| Main | Power supply | Automatic connection | ○ | ○ |
| | Load side | Terminal connection | ○ | |
| | | Automatic connection | | ○ |
| Control | Terminal connection | | □ | |
| | Multi-polarity connector | | | □ |

## Standard unit applicable table

| Motor capacity (kw) | | Rated current | MCCB | Mag. | TH-Relay | A-CT | | Control Tr. | | UNIT SIZE | | | Wire used | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 380~460V | 200~230V | | TYPE | Contactor | TYPE | Ammeter scale | CT(15VA) | VA | FUSE | Non-reversible | Reversible | Y-△ | (mm²) | |
| 0.2 | - | 0.56~0.84 | ABL-53 or ABL-103 | CH-5 SMC-20P | SPH-20 T-3NH | 5 | 5:5 | 75 | 2A | H2 | H3 (H2) ※Note 3 | H5 | 5.5 | 1. Unit size is inclusive of 2 auxiliary relays (Note 3). 2. If NEMA size is applied to electronic contactor, part of the unit size will be changed. |
| 0.4/0.55 | 0.2 | 1.0~1.6 | | | | 5 | | | | | | | | |
| 0.75 | - | 1.5~2.1 | | | | 5 | | | | | | | | |
| 1.1 | 0.4/0.55 | 1.8~2.8 | | | | 5 | | | | | | | | |
| 1.5 | 0.75 | 2.8~4.3 | | | | | | | | | | | | |
| 2.2 | 1.1 | 3.4~5.0 | | | | 10 | 10:5 | | | | | | | |
| 3.7 | 1.5 | 5.3~7.9 | | | | | | | | | | | | |
| - | 2.2 | 7.5~11.0 | | | SRH-20T TH-675 | 15 | 15:5 | | | | | | | |
| 5.5 | - | 8.8~13.0 | | | | | | | | | | | | |
| 7.5 | 3.7 | 12~17 | | CH-7.5N SMC-35P | | 30 | 30:5 | | | H3 | H4 | H6 | | |
| 11 | 5.5 | 18~26 | | | | | | | | | | | | |
| 15 | 7.5 | 23~31 | | | | 50 | 50:5 | | | | | | | |
| 18.5 | - | 28~42 | | CH-15N SMC-65P | TH-35 TH-1015 | 75 | 75:5 | 150 | 6A | H4 | H6 | H7 | 14 | |
| 22 | 11 | 35~50 | | | | | | | | | | | | |
| 30 | 15 | 46~58 | | | | | | | | | | | | |
| 37 | 18.5 | 56~84 | ABL-203 | CH-20NS SMC-80P | TH-50 | 100 | 100:5 | | | H7 | H9 | H9 | 38 | |
| 45 | 22 | 68~90 | | CH-30NS SMC-125P | TH-2530 | | | | | | | H10 | | |
| 55 | 30 | 85~125 | | | TH-100 | 200 | 200:5 | | | | | | 60 | |
| 75 | 37/40 | 102~150 | | CH-50NS SMC-180P | TH-150 TH-75H | | | | | | | | 80 | |
| 90/110 | 45/55 | 136~200 | ABH-403 | CH-75NS SMC-220P | | 300 | 300:5 | 300 | 10A | H10 | H14 | H14 | 100 | |
| 132 | - | 170~250 | | CH-100NS SMC-400P | | | | | | | | | 2×100 | |
| 150 | 75 | 204~270 | ABS-603 | | TH-400 | | | | | | | | | |

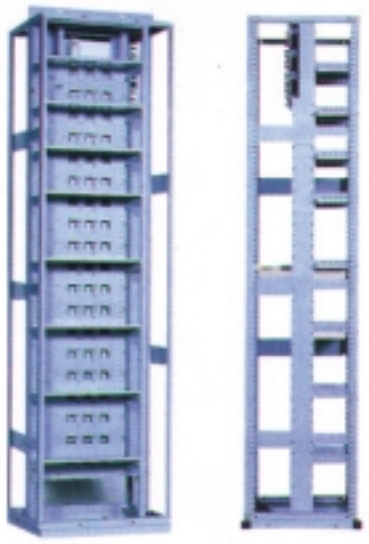
Note 1. The table is based on E-class 4-pole closed-type low-voltage cage motor.
2. MCCB model is varied according to the system's breaking capacity (the standard table is based on 42 kA).
3. If the unit size is H2, only 1 auxiliary relay is installed, and either CT or CONT.TR is chosen.
4. The unit draw-out structure applies to the standard specifications of Page 6.

## 1. Construction

A low-voltage motor controller of high efficiency, high reliability and versatility that can especially meet the requirements of high breaking capability in general and special industry applications.

- Modification of unit structure is easy and wiring work can be done with ease.
- Unit mounting part and duct part are isolated for safe and convenient wiring work.
- Enclosure can be relocated in unit of one side.
- Each unit is isolated by partition according to unit table so that internal accident of a unit may not spread to other unit(s).
- Bus compartment and unit compartment are completely isolated from each other by metal plates so that no internal accident may spread to busbar.
- When 200 mm unit is adopted, up to 9 units can be accommodated on one side.
- Units can be freely expanded in increment of 100 mm.
- The control bus line used allows full B-wiring.

Fig.22 Casing



**Wiring method and number of units accommodated (for single-plane type)**

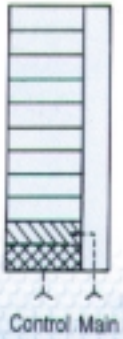
| Wiring method (JEM 1995) | | B–B<br>Main B<br>Control B | B–C<br>Main B<br>Control C | C–B<br>Main C<br>Control B | C–C<br>Main C<br>Control C |
|---|---|---|---|---|---|
| Stacks | 200 mm | 9 or 10 | 9 | 9 | 8 |
| | 300mm | 6 | 6 | 6 | 5 |
| Example | | Main Control | Control Main | Main Control |  Control Main |

Fig.23 Busbar and Busbar Obstruction

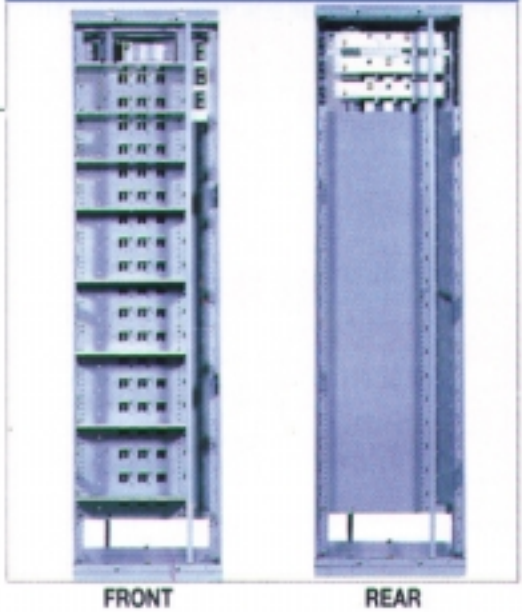



Fig.24 Horizontal bus

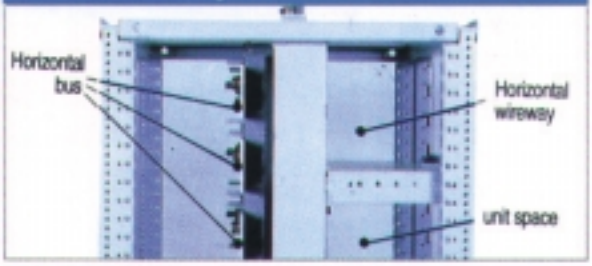
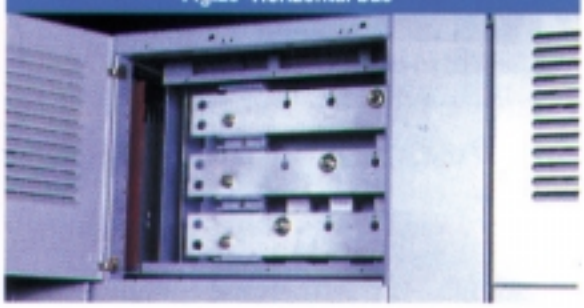



Fig.25 Horizontal bus



**Main bus**

**Horizontal bus(copper, Sn or Ag plated)**
**600A, 1200A, 800A, 1000A, 2000A, 2500A, 3000A, 3500A**

Horizontal bus is installed horizontally in the upper rear part of board so that draw-out of load cable from inside of the board to upper part becomes handy. Also, the front of the busbar compartment is used as a passage way for inter-board cable in case control power source is jointly shared or inter-board interlock is required.

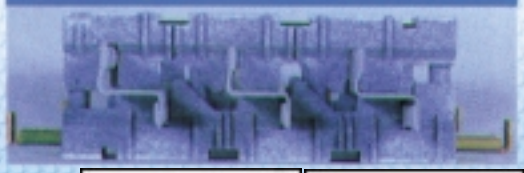
**Vertical bus (copper, Z- or L-type)**
**400A, 600A, 800A, 1000A**

With the adoption of LG' s own Z-shape bus, the short-circuit strength has been increased by about threefold. The busbar props are of fiber-reinforced polyester which is not moisture absorbent and has powerful mechanical strength. Vertical busbar is shielded by steel plates on both front and rear sides for enhanced safety.

**Ground bus**

Ground busbar is made of copper in standard size of 3 × 25 mm and is installed in the lower space of the board.

Fig.26 Vertical busbar props



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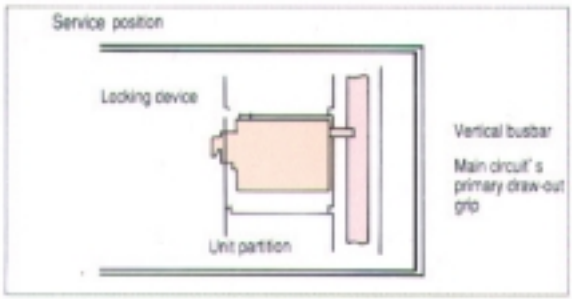
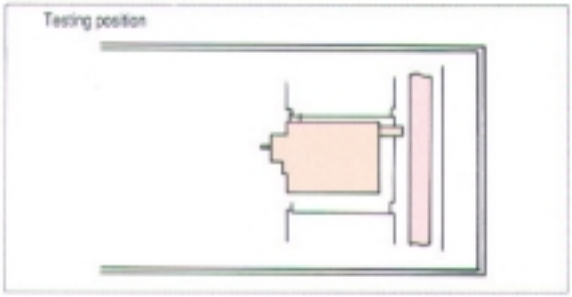
## Unit

The layouts of V-type unit and its door instruments are similar to that of GCC-H type. Refer to H-type for information. (If electronized motor control center is to be applied, unit components and instruments on the door may be different from general types. Please refer to corresponding LG catalogs in such cases).



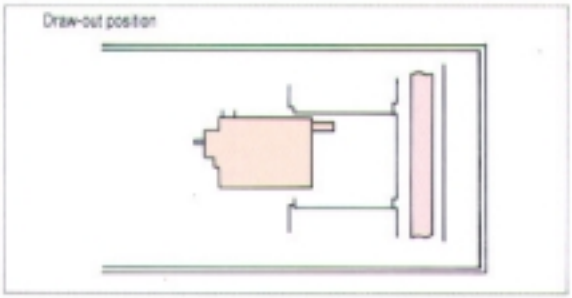

### Service position

Main circuit' s primary drawout grip is linked to vertical busbar and is locked by a locking device. If locking does not work, the possibility is that the unit might have not been properly inserted.




### Testing position

The system is automatically shifted to testing position if the locking device is turned 90° counterclockwise and the unit is pulled out. Leave the grip in locking position.
The main circuit' s primary draw-out grip has been separated from the vertical busbar.




### Draw-out position

The unit can be drawn out from the body by turning the grip of the locking device 180° to draw-out position.

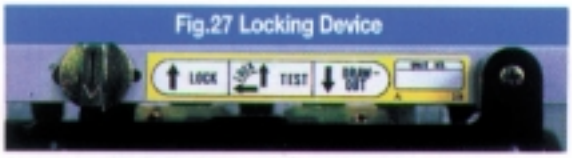



Fig.27 Locking Device

### Locking device

The unit has 3 different positions to choose from with the grip; thus no confusion arises.

## 2. Plan

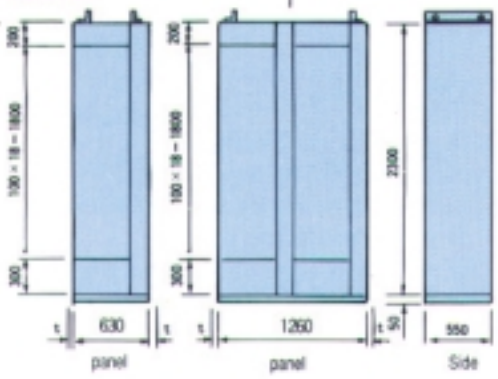
### External dimensions and installation

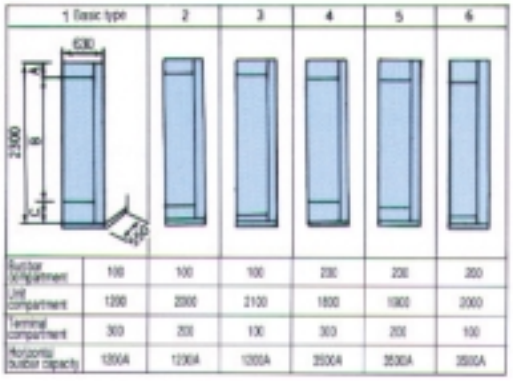
V-type control center is available in unit (1 side) of 600 or 630 mm (W), allowing convenient installation plan.

### Flexible enclosure planning

Unit compartment, busbar compartment and terminal compartment can be freely changed according to the capacity of vertical busbar. A wide version in 700 mm (W) × 700 mm (D) with expanded duct compartment is available for exclusive use with dual panel type.

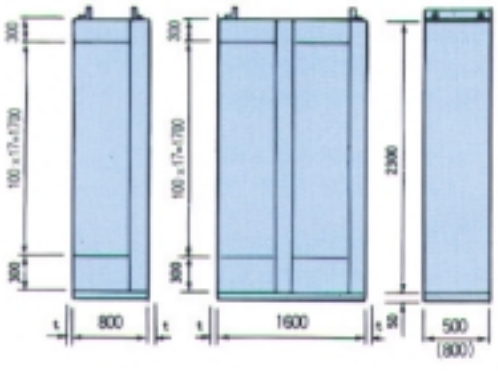
Front view

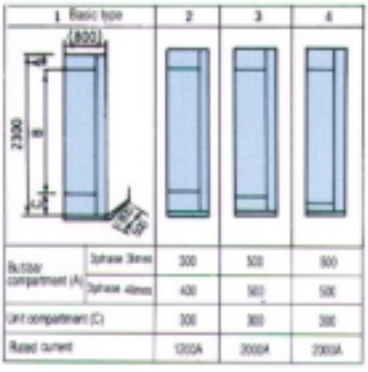



| | | | | | | |
|---|---|---|---|---|---|---|
| Busbar compartment | 100 | 100 | 100 | 200 | 200 | 200 |
| Unit compartment | 1200 | 2000 | 2100 | 1800 | 1800 | 2000 |
| Terminal compartment | 300 | 200 | 100 | 300 | 200 | 100 |
| Horizontal busbar capacity | 1200A | 1200A | 1200A | 2500A | 2500A | 2500A |

Rear view



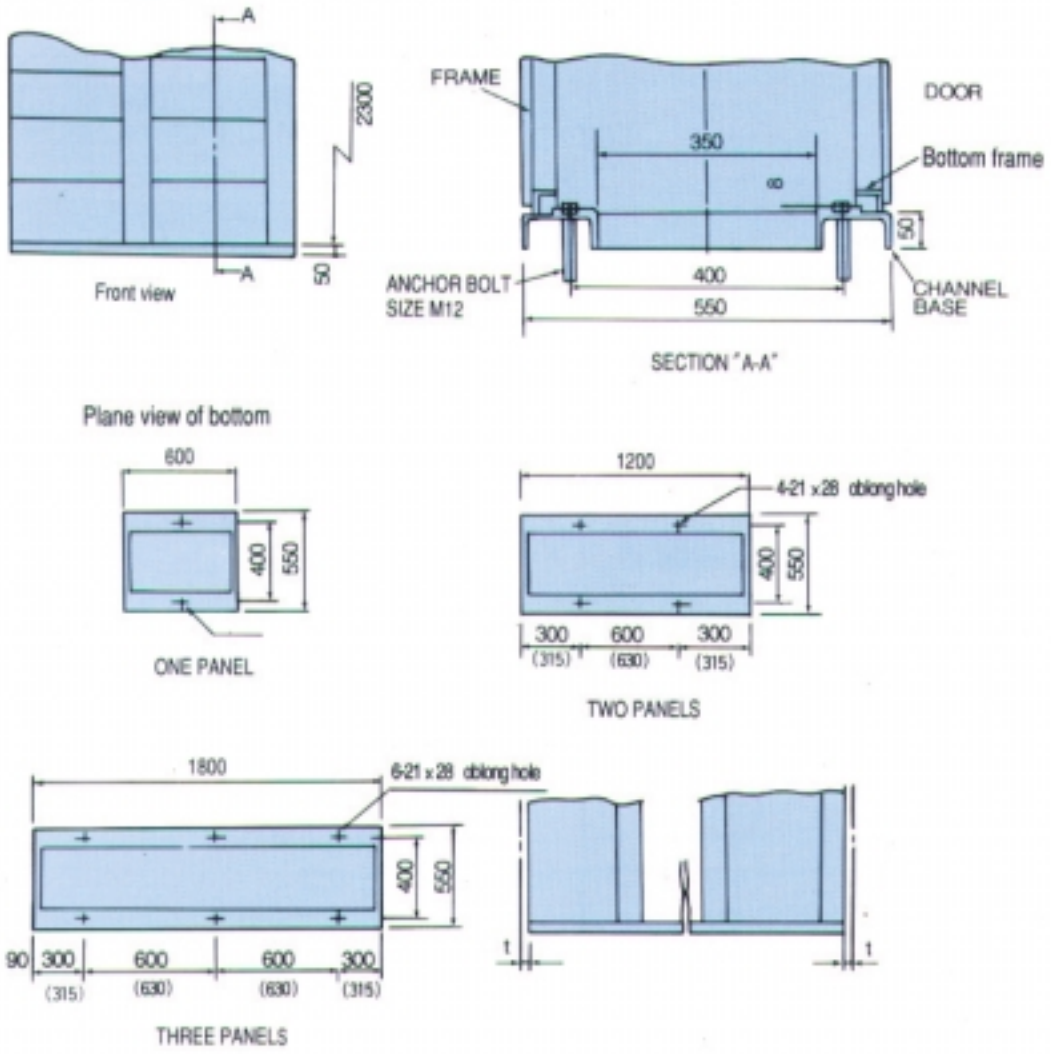




| | | | | |
|---|---|---|---|---|
| Busbar compartment (A) | 3phase 3wires | 300 | 500 | 600 |
| | 3phase 4wires | 400 | 600 | 700 |
| Unit compartment (C) | | 300 | 300 | 300 |
| Rated current | | 1200A | 3000A | 2500A |

## Installation

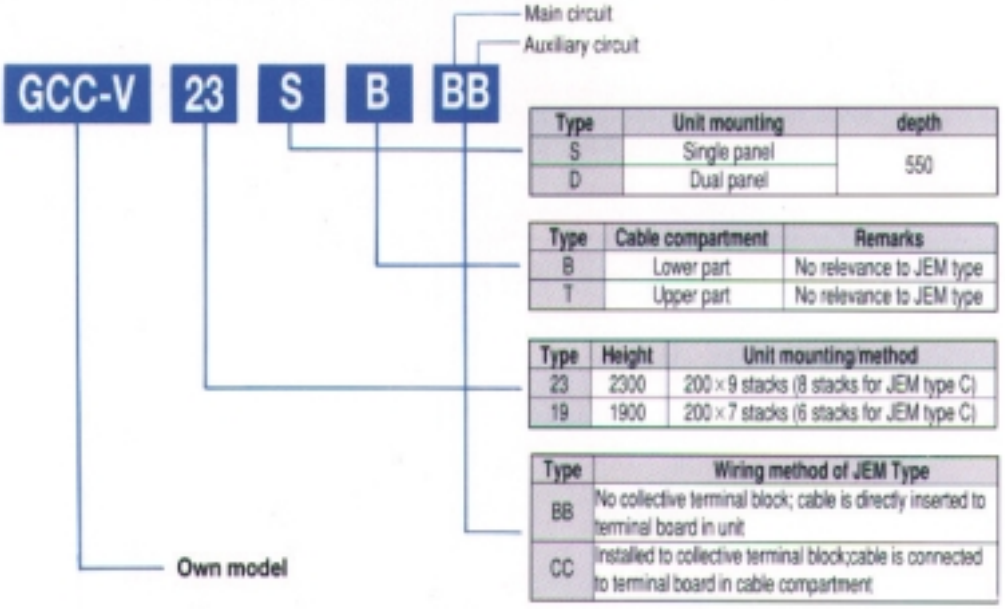
Channel base is used in V-type control center to improve safety during installation Fig. 32 shows basic installation drawings of this standard.

**Fig. 32 Basic installation drawings of V-type control center**




**Note :** 1. A side plate is installed at the end of the line-up.
2. The maximum number of planes for transportation is 3.
3. "t" denotes dimension of the side plate.

Fig.28 Standard specification code of V-type control




| Type | Unit mounting | depth |
|---|---|---|
| S | Single panel | 550 |
| D | Dual panel | |

| Type | Cable compartment | Remarks |
|---|---|---|
| B | Lower part | No relevance to JEM type |
| T | Upper part | No relevance to JEM type |

| Type | Height | Unit mounting method |
|---|---|---|
| 23 | 2300 | 200 × 9 stacks (8 stacks for JEM type C) |
| 19 | 1900 | 200 × 7 stacks (6 stacks for JEM type C) |

| Type | Wiring method of JEM Type |
|---|---|
| BB | No collective terminal block; cable is directly inserted to terminal board in unit |
| CC | Installed to collective terminal block;cable is connected to terminal board in cable compartment |

Fig.29 Unit' s standard specification code

| Unit model | | | S | A |
|---|---|---|---|---|
| Main | Power source | Automatic connection | ○ | ○ |
| | Load side | Terminal connection | ○ | |
| | | Automatic connection | | ○ |
| Control | Terminal connection | | ○ | |
| | Multi-polarity connector | | | ○ |

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## Standard unit applicable table

| Motor capacity (kw) | | Rated current | MCCB | Mag. | TH-Relay | A-CT | | Control Tr. | | UNIT SIZE | | | Wire used | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 380~460V | 200~230V | | TYPE | Contactor | TYPE | Ammeter scale | CT(15VA) | VA | FUSE | Non-reversible | Reversible | Y-△ | (mm²) | |
| 0.2 | - | 0.56~0.84 | ABL-53 or ABL-103 | CH-5 SMC-20P | SPH-20 T-3NH | 5 | 5:5 | 75 | 2A | H2 | H3 | H5 | 5.5 | 1. Unit size is inclusive of 2 auxiliary relays (Note 3).<br>2. If NEMA size is applied to electronic contactor, part of the unit size will be changed. |
| 0.4/0.55 | 0.2 | 1.0~1.6 | | | | 5 | | | | | | | | |
| 0.75 | - | 1.5~2.1 | | | | 5 | | | | | | | | |
| 1.1 | 0.4/0.55 | 1.8~2.8 | | | | 5 | | | | | | | | |
| 1.5 | 0.75 | 2.8~4.3 | | | | | | | | | | | | |
| 2.2 | 1.1 | 3.4~5.0 | | | | 10 | 10:5 | | | | | | | |
| 3.7 | 1.5 | 5.3~7.9 | | | | | | | | | | | | |
| - | 2.2 | 7.5~11.0 | | | SRH-20T TH-675 | 15 | 15:5 | | | | | | | |
| 5.5 | - | 8.8~13.0 | | | | | | | | | | | | |
| 7.5 | 3.7 | 12~17 | | CH-7.5N SMC-35P | | 30 | 30:5 | | | H3 | H4 | H6 | 14 | |
| 11 | 5.5 | 18~26 | | | | | | | | | | | | |
| 15 | 7.5 | 23~31 | | | | 50 | 50:5 | | | | | | | |
| 18.5 | - | 28~42 | | CH-15N SMC-65P | TH-35 TH-1015 | 75 | 75:5 | 150 | 6A | H4 | H6 | H7 | | |
| 22 | 11 | 35~50 | | | | | | | | | | | | |
| 30 | 15 | 46~58 | | | | | | | | | | | | |
| 37 | 18.5 | 56~84 | ABL-203 | CH-20NS SMC-80P | TH-50 | 100 | 100:5 | | | H7 | H9 | H9 | 38 | |
| 45 | 22 | 68~90 | | CH-30NS SMC-125P | TH-2530 TH-100 | | | | | | | H10 | | |
| 55 | 30 | 85~125 | | | | 200 | 200:5 | | | | | | 60 | |
| 75 | 37/40 | 102~150 | | CH-50NS SMC-180P | TH-150 | | | | | | | | 80 | |
| 90/110 | 45/55 | 136~200 | ABH-403 | CH-75NS SMC-220P | TH-75H | 300 | 300:5 | 300 | 10A | H10 | H14 | H14 | 100 | |
| 132 | - | 170~250 | | CH-100NS SMC-400P | | | | | | | | | 2×100 | |
| 150 | 75 | 204~270 | ABS-603 | | TH-400 | | | | | | | | | |

Note 1. The table is based on E-class 4-pole closed-type low-voltage cage motor.
2. MCCB model varies according to breaking capacity of the system (the standard table is based on 42kA).
3. Applies to cases where there is no control TR and there is one auxiliary relay.

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# GCC-N Type

A low-voltage motor control center with sufficient room reserved for installation and maintenance work, this model can be suitably applied to such general and special industrial facilities as thermal power plants, nuclear power plants, petrochemical plants, cement plants, paper mills, water disposal facilities, steel mills and the likes, where functionality and high degree of reliability are required. Its versatility and safety features are exhibited by the fact that, in the case of dual-plane types, horizontal and vertical bus are mounted respectively at the front and rear to form a dual bus structure; main circuit's primary and secondary sides and control circuit can be inserted/drawn-out collectively and automatically; and an automatic shutter is provided.

## 1. Construction

The body consists of horizontal and vertical bus compartment, unit compartment and cable compartment, and they are compartmentalized to prevent spread of accident.

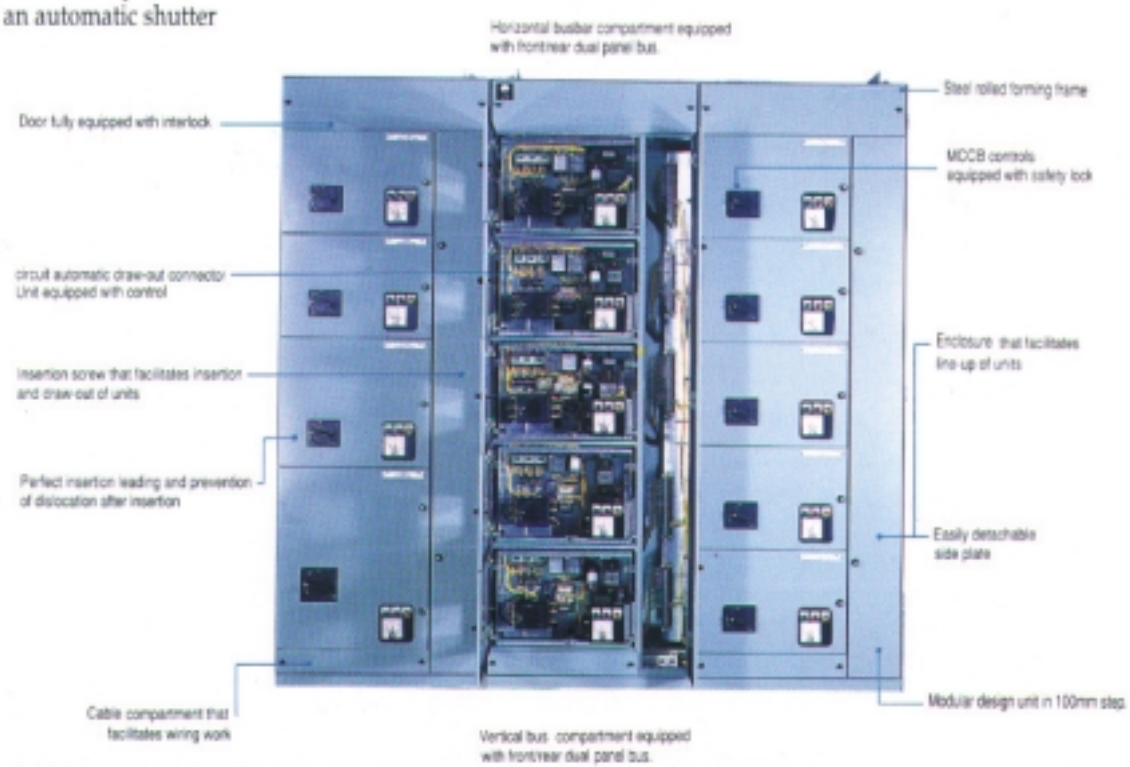
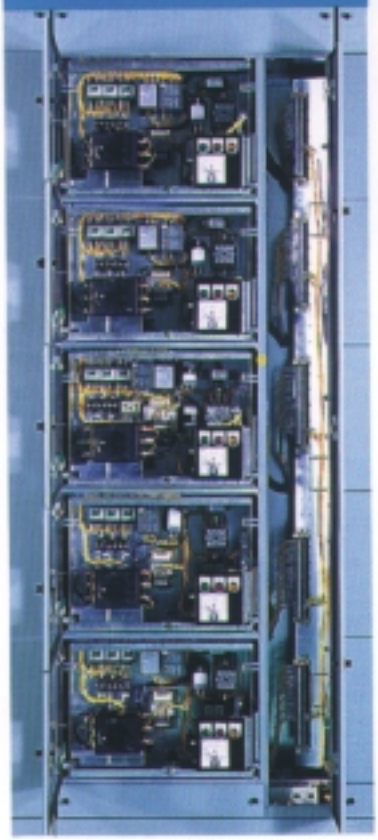
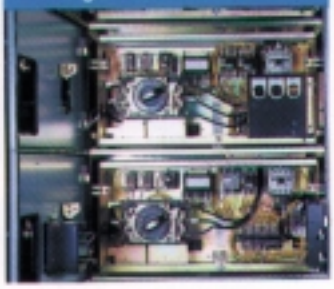

Horizontal busbar compartment equipped with front/rear dual panel bus
Steel rolled forming frame
Door fully equipped with interlock
MCCB controls equipped with safety lock
circuit automatic draw-out connector Unit equipped with control
Enclosure that facilitates line up of units
Insertion screw that facilitates insertion and draw-out of units
Perfect insertion leading and prevention of dislocation after insertion
Easily detachable side plate
Modular design unit in 100mm step
Cable compartment that facilitates wiring work
Vertical bus compartment equipped with front/rear dual panel bus

Fig.30 Structure of N-type control center



B-B wiring cable compartment with sufficient space for ease of cable work.

Fig.31 Minimized unit

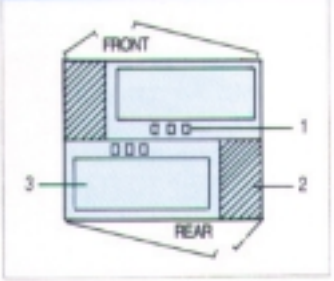


Provision of space for maintenance and minimization of unit are simultaneously achieved.

Fig.32 Terminal compartment

With the adoption of B-B, terminal compartment can also be used as a unit compartment.

Fig.33 Horizontal cross-section




Vertical busbars are overlapped for common use of front and rear units.

1. Vertical busbar
2. Cable compartment
3. Unit compartment

## Wiring method and Stacks

| Wiring method ( JEM 1995 ) | | B – B | B – C | C – B | C – C |
|---|---|---|---|---|---|
| | | Main B | Main B | Main C | Main C |
| | | Control B | Control C | Control B | Contol C |
| Stacks | 200mm | 9 or 10 | 9 | 9 | 8 |
| | 300mm | 6 | 6 | 6 | 5 |
| Example | | Main Control | Control Main | Main Control | Control Main |

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## Bus

### Horizontal bus

Horizontal bus is situated at the upper part and made in dual form if rated current exceeds 2000A as shown in Fig. 34. Horizontal bus compartment is structurally isolated from vertical busbar compartment and unit compartment to ensure safety. Exclusive front and rear plane bus are designed to respond readily to increased current capacity.

### Vertical bus

Vertical bus is installed in the manner shown in horizontal section view of Fig. 33. For dual panel type, exclusive front and rear panel bus are installed to commonly use front and rear units. Safety shutter is automatically opened and closed by the opening guide mounted in the rear of unit. Phases are separated by barriers from each other to satisfy the requirements of various standards.

### Material of bus supporter

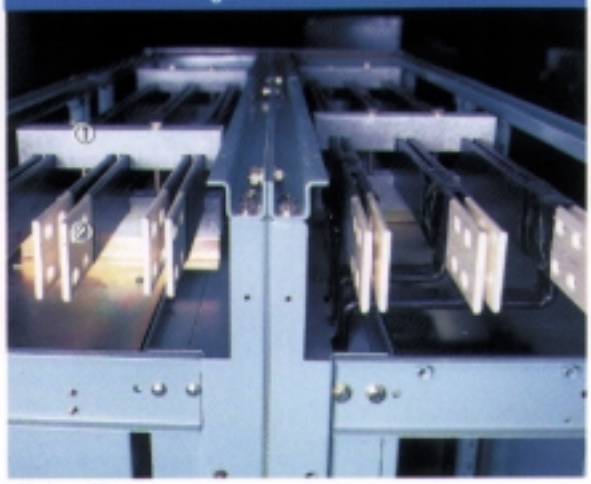
Bus props are made of fiber-glass polyester that can sufficiently withstand short-circuit currents.

| Item | Ratings |
|---|---|
| Horizontal bus (A) | 600, 800, 1200, 1500<br>2000, 2500, 3000, 3500, 4000 |
| Vertical bus (A) | 400, 600, 800, 1000A |

### Ratings of bus

Refer to Table 1 for bus ratings.

Fig.34 Horizontal bus

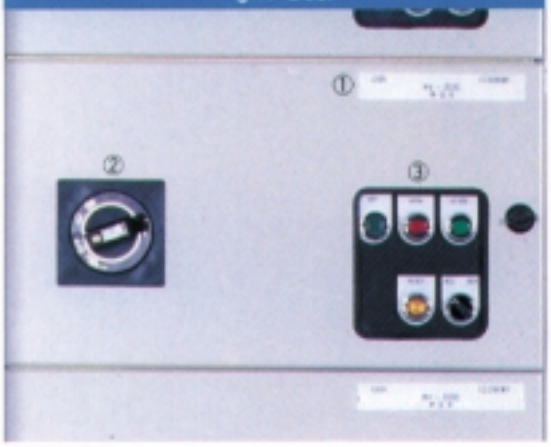


1.Horizontal bus supporter
2.Horizontal bus

Fig.35 Vertical bus

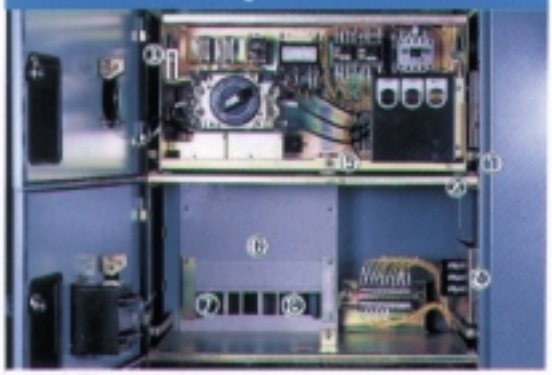
1.Vertical bus
2.Vertical bus supporter

Fig.36 Door




1. Name plate
2. External control handle of MCCB
3. Control monitoring panel

Fig.37 Unit



1. Unit guide rail
2. Unit partition
3. Unit clamping device
4. Main circuit' s secondary draw-out grip
5. Unit insertion screw
6. Safety shutter
7. Vertical busbar
8. Inter-phase barrier

## Door

Installed at the front of the door are device for external control of circuit breaker (MCCB), for wiring name plate, operating condition indicator lamp, push button, reset button, and control and monitoring panel with an assortment of ammeters. For facilitation of smooth insertion and draw-out of units, the control and monitoring panel is attached to the unit, and door wiring has been spared. The door is designed to open and close for easy access during maintenance. For external control of MCCB, refer to GCC-H type.

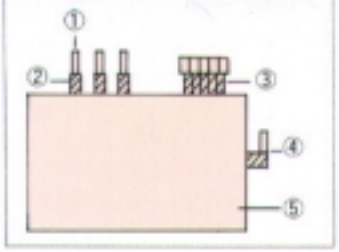
## Unit partition and guide rail

For the purpose of preventing spread of accident, the top and bottom of the units are shielded with metal plates. Wheels are attached to the unit and guide rails are provided on the frame to facilitate draw -out and insertion of the unit.

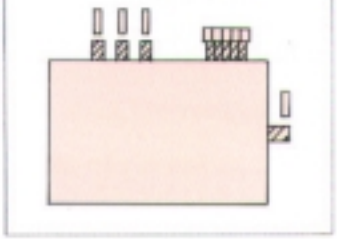
## Unit inserting screw and unit clamping device

Units can be inserted or drawn out by turning the insertion screw clockwise or counterclockwise by the handle. Complete insertion is also achieved. Loosening of units can be prevented by insertion screw alone after finish of insertion; but a unit clamping device is further provided to ensure firm fixation during heavy vibration (during transportation).

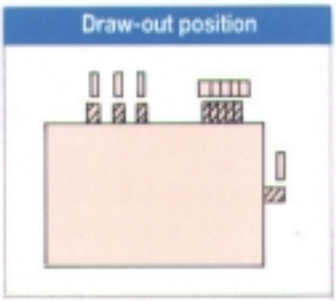
Service position




Testing position



Draw-out position

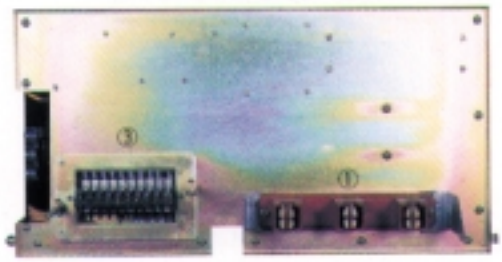


1. Vertical busbar
2. Main circuit' s primary draw-out grip
3. Auxiliary circuit automatic draw-out connector
4. Main circuit' s secondary draw-out grip
5. Draw-out type unit

## Unit

Height of drawable unit ranges from minimum of 200 mm to maximum of 1000 mm. The height is incremented by 100 mm pitches. MCCB, electronic switches, auxiliary relays, timer, CT, ZCT, control transformer, fuses are placed at the front of the unit while main circuit's primary draw-out grip, control's automatic connector and safety shutter opening guide are situated in the rear.
Main circuit' s secondary draw-out grip is installed on the right side.

Fig.38 Rear of unit




1. Main circuit' s primary draw-out grip
2. Main circuit' s secondary draw-out grip
3. Auxiliary circuit automatic draw-out connector

## Control, monitoring panel

Control/monitoring panel is attached to the lower right part of the unit with hinges and designed to open and close for ease of maintenance and checking. Installed on its front are control/ monitoring,illuminated push button, reset push button, switches and ammeters.

## Unit positions

- Service position
  Main circuit' s primary and secondary draw-out grips and automatic control circuit draw-out connector are connected to power source and load side components while the unit clamping device is in locked state. If locking is not effected, the possibility is that the unit might have not been inserted fully.
- Testing position
  Only control circuit draw-out connector is connected in this position and main circuit' s primary and secondary draw-out grips are disconnected from power source and load side components.
- Draw-out position
  Main circuit' s primary and secondary draw-out grips and automatic control circuit draw-out connector are disconnected in this position. The unit can be completely drawn-out from the body.

## 2. Plan

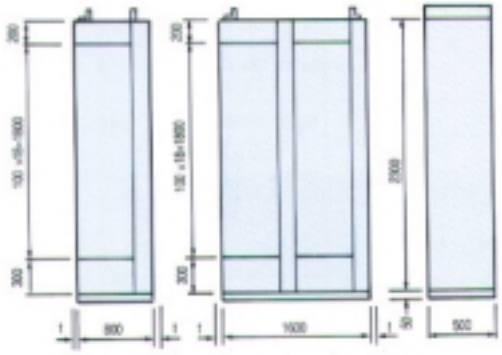
### Dimensions and installation of casing

N-type control center is available in unit (1 side) of 800 mm (W), allowing convenient installation plan.

### Flexible enclosure plan

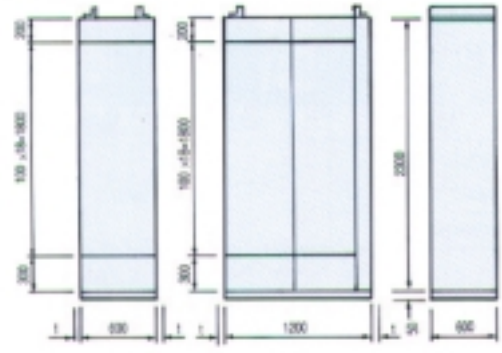
- Unit compartment, busbar compartment and terminal compartment can be freely changed according to the capacity of horizontal busbar.
- Compact type is designed to be accessed from the rear for maintenance and has a structure that allows connection of incoming cable to load side draw-out device. It is used in single plane type only.

### Standard type



| 1(Basic type) | | | 2 | 3 |
|---|---|---|---|---|
| Busbar compartment | A | 280 | 230 | 200 |
| Unit compartment | B | 1800 | 1800 | 2000 |
| Terminal compartment | C | 300 | 200 | 100 |
| Horizontal busbar capacity(A) | | 600~2000(1200~4000) | | |

### Rear View

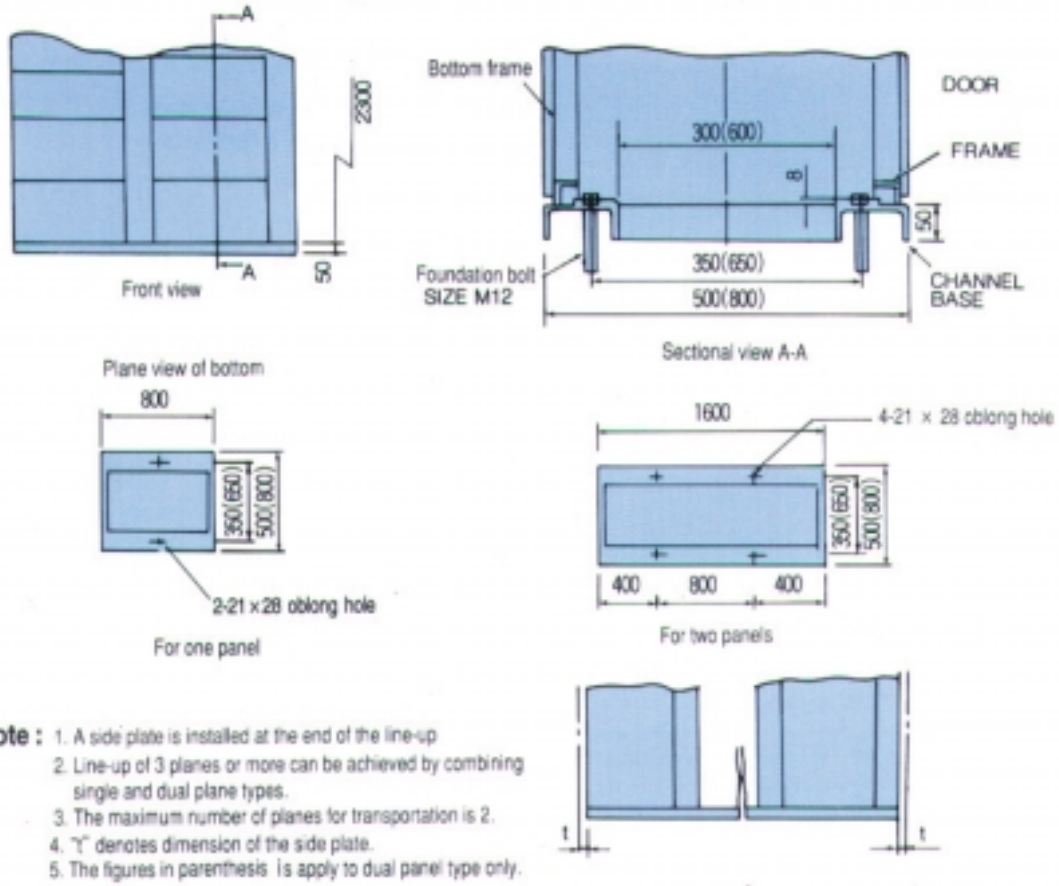


| 1(Basic type) | | | 2 | 3 |
|---|---|---|---|---|
| Busbar compartment | A | 280 | 230 | 200 |
| Unit compartment | B | 1800 | 1800 | 2000 |
| Terming compartment | C | 300 | 200 | 100 |
| Horizontal busbar capacity(A) | | 600~2000 | | |

## Installation

Channel base is used in N-type control center to improve safety during installation.

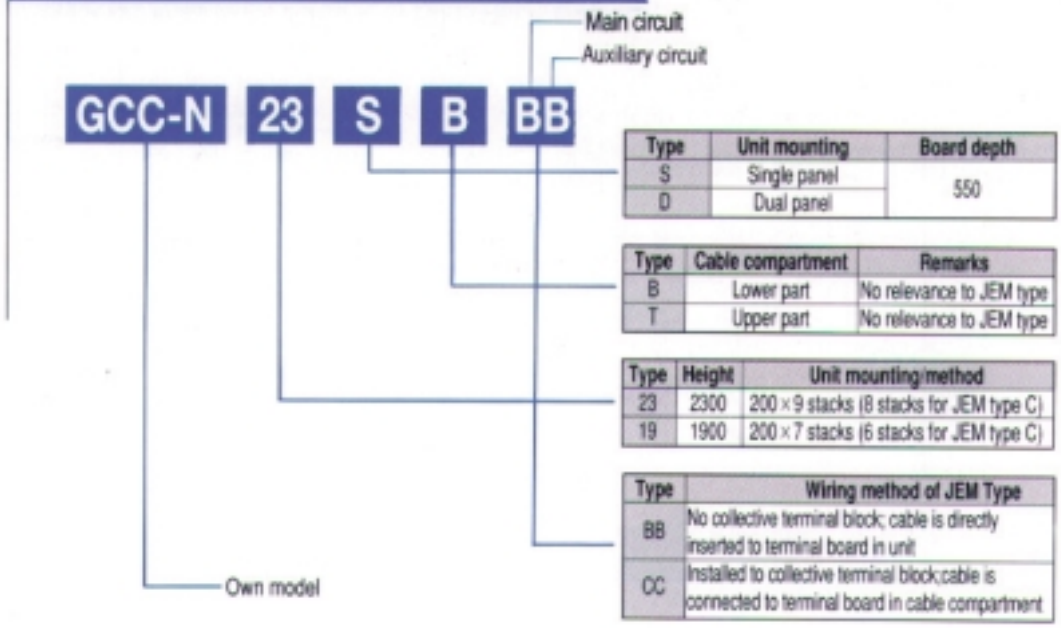
**Fig.39 Basic installation diagrams of standard N-type control center**




**Note :**
1. A side plate is installed at the end of the line-up
2. Line-up of 3 planes or more can be achieved by combining single and dual plane types.
3. The maximum number of planes for transportation is 2.
4. "t" denotes dimension of the side plate.
5. The figures in parenthesis is apply to dual panel type only.

## Control Center Plan

Fig.40 Standard specification codes for N-type control center




| Type | Unit mounting | Board depth |
|---|---|---|
| S | Single panel | 550 |
| D | Dual panel | |

| Type | Cable compartment | Remarks |
|---|---|---|
| B | Lower part | No relevance to JEM type |
| T | Upper part | No relevance to JEM type |

| Type | Height | Unit mounting/method |
|---|---|---|
| 23 | 2300 | 200 × 9 stacks (8 stacks for JEM type C) |
| 19 | 1900 | 200 × 7 stacks (6 stacks for JEM type C) |

| Type | Wiring method of JEM Type |
|---|---|
| BB | No collective terminal block; cable is directly inserted to terminal board in unit |
| CC | Installed to collective terminal block;cable is connected to terminal board in cable compartment |

Fig.41 Unit' s standard specification code

| Unit model | | | S | A |
|---|---|---|---|---|
| Main | Power supply | Automatic connection | ○ | ○ |
| | Load side | Terminal connection | ○ | |
| | | Automatic connection | | ○ |
| Control | Terminal connection | | ○ | |
| | Multi-polarity connector | | | ○ |

Basic model (S) Semiautomatic model (A)

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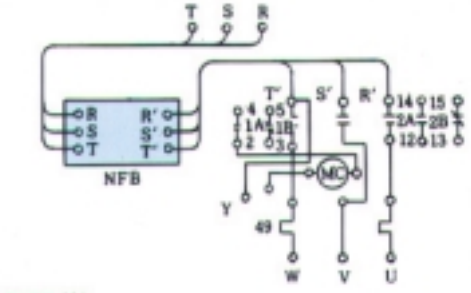
## Standard Unit Applicable Table

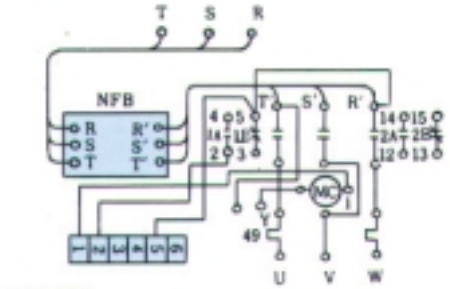
| Motor capacity (kw) | | Rated current | MCCB | Mag. | TH-Relay | A-CT | | Control Tr. | | UNIT SIZE | | | Wire used | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 380~460V | 200~230V | | TYPE | Contactor | TYPE | Ammeter scale | CT(15VA) | VA | FUSE | Non-reversible | Reversible | Y-△ | (mm²) | |
| 0.2 | - | 0.56~0.84 | ABL-53 or ABL-103 | CH-5 SMC-20P | SPH-20 T-3NH | 5 | 5:5 | 75 | 2A | H2 | H3 (H2) *NOTE.3 | H5 | 5.5 | 1. Unit size is inclusive of 2 auxiliary relays (Note 3).<br>2. If NEMA size is applied to electronic contactor, part of the unit size will be changed. |
| 0.4/0.55 | 0.2 | 1.0~1.6 | | | | 5 | | | | | | | | |
| 0.75 | - | 1.5~2.1 | | | | 5 | | | | | | | | |
| 1.1 | 0.4/0.55 | 1.8~2.8 | | | | 5 | | | | | | | | |
| 1.5 | 0.75 | 2.8~4.3 | | | | | | | | | | | | |
| 2.2 | 1.1 | 3.4~5.0 | | | | 10 | 10:5 | | | | | | | |
| 3.7 | 1.5 | 5.3~7.9 | | | | | | | | | | | | |
| - | 2.2 | 7.5~11.0 | | | SRH-20T TH-675 | 15 | 15:5 | | | | | | | |
| 5.5 | - | 8.8~13.0 | | | | | | | | | | | | |
| 7.5 | 3.7 | 12~17 | | CH-7.5N SMC-35P | | 30 | 30:5 | | | H3 | H4 | H6 | | |
| 11 | 5.5 | 18~26 | | | | | | | | | | | | |
| 15 | 7.5 | 23~31 | | | | 50 | 50:5 | | | | | | | |
| 18.5 | - | 28~42 | | CH-15N SMC-65P | TH-35 TH-1015 | 75 | 75:5 | | | H4 | H6 | H7 | 14 | |
| 22 | 11 | 35~50 | | | | | | | | | | | | |
| 30 | 15 | 46~58 | | | | | | 150 | 6A | | | | | |
| 37 | 18.5 | 56~84 | ABL-203 | CH-20NS SMC-80P | TH-50 | 100 | 100:5 | | | H7 | H9 | H9 | 38 | |
| 45 | 22 | 68~90 | | CH-30NS SMC-125P | TH-2530 | | | | | | | H10 | | |
| 55 | 30 | 85~125 | | | TH-100 | 200 | 200:5 | | | | | | 60 | |
| 75 | 37/40 | 102~150 | | CH-50NS SMC-180P | TH-150 | | | | | | | | 80 | |
| 90/110 | 45/55 | 136~200 | ABH-403 | CH-75NS SMC-220P | TH-75H | 300 | 300:5 | 300 | 10A | H10 | H14 | H14 | 100 | |
| 132 | - | 170~250 | | CH-100NS SMC-400P | | | | | | | | | 2×100 | |
| 150 | 75 | 204~270 | ABS-603 | | TH-400 | | | | | | | | | |

**Note :** 1. The table is based on E-class 4-pole closed-type low-voltage cage motor.
2. MCCB model varies according to breaking capacity of the system (the standard table is based on 42kA).
3. Applies to cases where there is no control Tr. and there is one auxiliary relay.

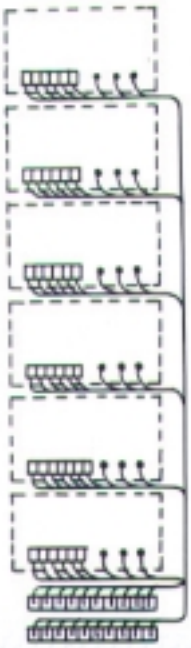
Fig.42 External connection method based on JEM1195




TYPE (A)




TYPE (B)



TYPE (C)

### Type "A"

The connection is made as shown in Fig. 42 (a). Connection from outside to instruments inside the unit is made through a duct at the side of the unit.

### Type "B"

Draw-out terminals are provided inside the unit and the rest are the same as those of type "A". This is the standard connection method of LG and is recommended for its safeness and reliability [Fig. 42 (b)].

### Type "C"

Inside of the unit is the same as that of type "B" with the exception of added draw-out terminals for main circuit and manipulation circuit at either lower or upper part.

### Advantages of JEM (NEMA) type "B" wiring and recommendation

Use of type "B" wiring yields the following advantages:

(1) As there is no collective terminal block, additional installation or refit work of a unit becomes possible irrespective of other units, and very safe.
(2) Maintenance becomes easy as chances of accident at collective terminal block are eliminated and contact points are strengthened.
(3) Readily responsive to alteration.
(4) Manufacturing period can be shortened for faster delivery.
(5) As cable draw-out terminal blocks are dispersed among units, chances of mistaken wiring or checking have been decreased.
(6) As cable can be led in at either upper or lower part, work can be planned with flexibility resulting in convenience in actual work.

"B" wiring has a wide range of advantages as indicated and H-type control center is designed to reflect the advantages. LG therefore strongly recommends use of this model.

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Memo

TÜV CERT

# CERTIFICATE

**The TÜV CERT Certification Body of TÜV Rheinland Sicherheit und Umweltschutz GmbH**

hereby certifies in accordance with TÜV CERT procedures that

**LG Industrial Systems Co., Ltd.**

**#736, Osan-Dong, Osan-City, Gyeonggi-Do, Republic of Korea**

has established and applies a quality system for

**Design & Manufacturing of Electrical Power Distribution & Control Systems and Ultra-High Voltage Switchgear**

An audit was performed,

Report No. **3284**

Proof has been furnished that the requirements according to

**DIN EN ISO 9001**

are fulfilled.

The certificate is valid until **October 1999**

Certificate Registration No. **00 100 3284**

Cologne, 20.02.1997

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